

REMARKS/ARGUMENTS

Claim Rejections – 35 USC 112, first paragraph

Claims 3, 4, 7, 8 and 14 are rejected as reciting a determination of the weight percent of the single layer and multiple layers of silicate material by transmission electron microscopy (TEM) but there is no teaching in the specification with respect to such measurement.

Page 2 of the specification has been amended by inserting after line 23 a new paragraph teaching the transmission electron microscopy (TEM) measurement.

Claim Rejections – 35 USC 112, second paragraph

Claims 4, 8, 14 and 15 are rejected as being improper multiple dependent claims for depending on another multiple dependent claim. The claims have been amended to comply with the requirements of 35 USC 112, second paragraph.

Claim Rejections – 35 USC 103

The test for obviousness is whether the claimed invention, as a whole, in light of all of the teachings of the references in their entireties, would have been obvious to a person of ordinary skill in the art at the time that the invention was made. Id. at 199. If a reference must be modified to obtain the patented invention, then the reference does not anticipate, and the reference can only establish prima facie obviousness if some prior art reference gives the suggestion to make that modification. The evidence is not sufficient to support even a prima facie case of obviousness if such a reference is not cited. In re Grabiak, 226 USPQ 870, 872 (Fed. Cir. 1985); Ex parte Dassaud, 7 USPQ 1818, 1820 (PTO Bd. App. 1988).

Claims 1-15, are rejected under 35 USC 103(a) as being unpatentable over WO 93/04117 in view of Suss et al. (US 4,558,075), or further in view of Brown et al. (US 4,964,918) (D5). This rejection is respectfully traversed for the following reasons.

As stated in the International Preliminary Examination Report, neither WO 93/04117, nor Suss et al., (US 4,558,075) discloses the preparation of nanocomposites

from an anionic polymer edge-coated quaternary intercalated multilayered silicate material

US 4,964,918 (Brown et al.) deals with a water-based system. The present invention deals with a polymer-based system. Brown deals with the problem of agglomeration. The present invention deals with the problem of increasing exfoliation. Brown is silent on treating the edge treated clay with a quaternary ammonium compound. The claims of the present invention require that the edge-treated clay be intercalated with a quaternary ammonium compound.

The fact that Brown discloses that edge treatment solves the problem of agglomeration in a water-based system is not sufficient to negate the patentability of the present invention as recited in Claims 1-15, because, among other things: (a) the present invention involves a completely different polymer-based system; (b) the present invention deals with a different problem; and (c) the present invention requires that the edge-treated clay also be intercalated with a quaternary ammonium compound. Although Brown teaches the use of anionic polymers to prevent the agglomeration of the exfoliated layers, Brown does not teach the use of edge coating to improve the dispersibility of the silicate in a polymer matrix.

In view of the above amendments and remarks, Applicants believe that Claims 1-15 are patentable over WO 93/04117 in view of Suss et al. (US 4,558,075), or further in view of Brown et al. (US 4,964,918).

Claims 16-19 are rejected under 35 USC 103(a) as being unpatentable over Kawasumi et al. (US 4,810,734) or Polansky et al. (US 6,287,992) in view of Suss et al. (US 4,558,075), or further in view of Brown et al. (US 4,964,918). This rejection is respectfully traversed for the following reasons.

Neither Kawasumi nor Polansky teaches or suggests a quaternary ammonium intercalated multi-layered silicate material having been reacted with a polyvalent anionic organic material so that the edges of the multi-layered silicate material are bound to the polyvalent anionic organic material to form a polyvalent anionic organic edge coated quaternary ammonium intercalated multi-layered silicate material, as required in Claims 16-19.

Suss et al. and Brown et al. have been discussed above.

In view of the above remarks, Applicants submit that Claims 16-19 are patentable over Kawasumi et al. (US 4,810,734) or Polansky et al. (US 6,287,992) in view of Suss et al. (US 4,558,075), or further in view of Brown et al. (US 4,964,918).

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made.

Conclusion

In view of the above amendments and remarks, the claims are now in condition for allowance and a Notice of Allowance of Claims 1 to 19 is respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

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In the claims

Claims 4, 8, 14 and 15 have been amended as follows:

4. The process of ~~Claim 1 or Claim 3~~, wherein the thermoplastic polymer is a blend of thermoplastic polymers.
8. The process of ~~Claim 5 or Claim 7~~, wherein the thermoset polymer is a blend of thermoset polymers.
14. The process of ~~Claims 1-94, 8 or 9~~, wherein the polyvalent anionic organic material is a polyacrylate.
15. The composition of Claims 10-13, wherein the polyvalent anionic organic material is a polyacrylate.